M54547P

BI-DIRECTIONAL MOTOR DRIVER WITH OP AMP AND TRANSISTOR ARRAY

DESCRIPTION

The M54547P, BI-DIRECTIONAL MOTOR DRIVER, consists of a full bridge power driver and dual general purpose NPN darlington pairs.

FEATURES

- 600mA output current
- Braking mode input
- Integral operational amplifier at direction control input
- Output transient suppression

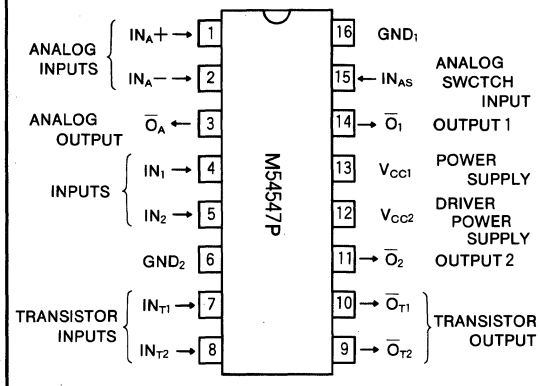
APPLICATION

Audio, video cassette recorder

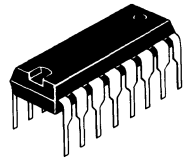
FUNCTION

The M54547P, full bridge motor driver, has the logic circuitry and darlington power drivers for bidirectional control of D-C motors operating at currents up to 600mA. The operational amplifier is connected to the direction control input through an analog switch controlled by pin 15 input. By switching the IN_{AS} input high and the IN_1 input low, the output of the amplifier appears at the output $\overline{O}_1$ so that the voltage across the bridge output is altered linearly by the amplifier input. The internal NPN darlington pairs are capable of sinking 300mA and will withstand 20V in the OFF state.

PIN CONFIGURATION (TOP VIEW)

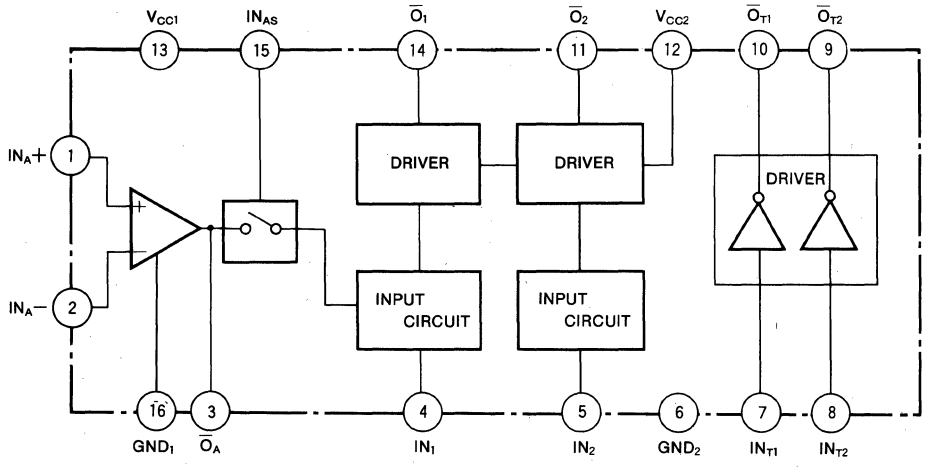


Outline 16P4



16-pin molded plastic DIL

BLOCK DIAGRAM



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LOGIC TRUTH TABLE

Input			Output		Note
IN_{SW}	IN_1	IN_2	$\overline{O}_1$	$\overline{O}_2$	
L	L	L	H	H	Braking
L	L	H	H	L	↻
L	H	L	L	H	↻
L	H	H	L	L	Braking
H	L	L	A*	H	Analog ↻
H	L	H	A*	L	Analog ↻
H	H	L	L	H	↻
H	H	H	L	L	Braking

A* : The output voltage is controlled by the amplifier output.

ABSOLUTE MAXIMUM RATINGS (T_a=25℃,unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC1}	Supply voltage		−0.5～+16	V
V_{CC2}	Driver supply voltage		−0.5～+16	V
V_I,V_{IAS}	Input voltage		0～V_{CC}	V
V_O	Output voltage		−0.5～V_{CC2}+2.5V	V
I_{OP}	Peak output current	t_{OP}=10ms : Repetitive cycle 0.2Hz max	±600	mA
I_O	Continuous output current		±150	mA
V_{CEO}	Collector-emitter applied voltage(transistor array)		20	V
I_C	Collector current(transistor array)		300	mA
V_I	Input voltage(Transistor array)		10	V
P_d	Power dissipation	T_a=25℃	1.47	W
		T_a=60℃	1.06	
T_{opr}	Operating ambient temperature range		−10～+60	℃
T_{stg}	Storage temperature range		−55～+125	℃

RECOMMENDED OPERATING CONDITIONS (T_a=25℃, unless otherwise noted)

Symbol	Parameter	Limits			Unit
		Min	Typ	Max	
V_{CC1}	Supply voltage	4	12	15	V
I_O	Continuous output current			±100	mA
V_{IH}	Input voltage(motor driver)	3		V_{CC}	V
V_{IL}	(IN_1, IN_2, IN_{AS})	0		0.6	
t_B	Motor braking interval	100			ms
V_{IH}	Transistor array input voltage	4		10	V
V_{IL}	(IN_{T1}, IN_{T2})	0		0.6	

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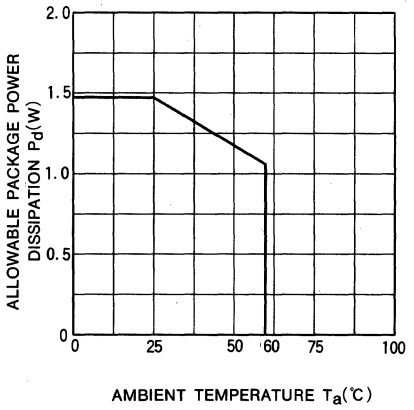
ELECTRICAL CHARACTERISTICS (T_a=25℃, unless otherwise noted)

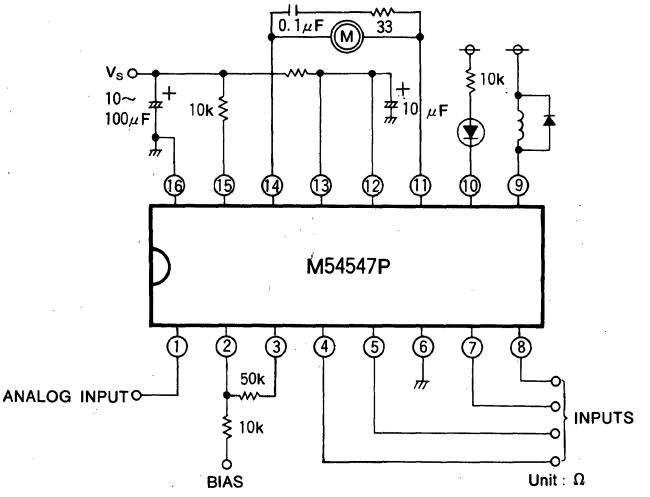
Symbol	Parameter	Test conditions		Limits			Unit
				Min	Typ	Max	
$I_{O(leak)}$	Output leakage current($\overline{O}_1$, $\overline{O}_2$)	$V_{CC1}=V_{CC2}=16V$	$V_O=0V$			±100	μA
		$V_{IN1}=V_{IN2}=V_{IAS}=0V$	$V_O=16V$				
V_{OH}	"H"Output saturation voltage($\overline{O}_1$, $\overline{O}_2$)	$V_{CC1}=V_{CC2}=12V$	$V_{IN1}=0V$, $V_{IN2}=3V$	10.3			V
		$I_O=-150mA$	$V_{IN1}=3V$, $V_{IN2}=0V$				
V_{OL}	"L"Output saturation voltage($\overline{O}_1$, $\overline{O}_2$)	$V_{CC1}=V_{CC2}=12V$	$V_{IN1}=0V$, $V_{IN2}=3V$			1.2	V
		$I_O=150mA$	$V_{IN1}=3V$, $V_{IN2}=0V$				
I_I	Input current(IN_1, IN_2, IN_{AS})	$V_{CC1}=12V$, $V_I=3V$				0.3	mA
$I_{O(leak)}$	Output leakage current($\overline{O}_{T1}$, $\overline{O}_{T2}$)	$V_O=30V$, $V_I=0.6V$				100	μA
V_{OC}	"L"Output saturation voltage	$V_I=4V$	$I_C=100mA$			1.3	V
			$I_C=200mA$			1.5	
I_I	Input current	$V_I=4V$				0.8	mA
A_O	OP Amp open-loop-gain			40			dB
I_{CC1}	Supply current	$V_{CC1}=12V$, $V_{IN1}=V_{IN2}=V_{IAS}=3V$				6	mA

TYPICAL CHARACTERISTICS

ALLOWABLE AVERAGE POWER DISSIPATION



TYPICAL APPLICATION



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